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**Watershed Protection: A Statewide Approach**  
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**Appendix A: How Does Ground Water Protection  
Fit?**

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## **Appendix A: How Does Ground Water Protection Fit?**

### **A.1 Perspective**

Considerable concern has been expressed by water resource managers about how ground water protection is integrated with a statewide basin approach. The need for integrating surface and ground water is clear since the quality of ground water contributes to the general condition of a watershed and may serve as a medium for transporting pollutants to surface waters.

Furthermore, by coordinating the state's basin approach with its Comprehensive State Ground Water Protection Program (CSGWPP), a state may be able to leverage the authority and resources of programs outside the normal surface water management arena. Starting in 1984, EPA began working with states to create ground water protection strategies to coordinate efforts under some 20 federal ground water programs. There are ground water provisions focusing on hazardous substances impacts through programs under the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act governing waste disposal sites and remediation of Superfund sites. Initiatives under the Federal Insecticide, Fungicide and Rodenticide Act regulate the use of agrichemicals. The Safe Drinking Water Act encourages states to develop Wellhead Protection Plans and allows the designation of Sole Source Aquifers to provide additional safeguards from the impacts of various federally assisted projects.

The states' CSGWPPs integrate these various programs and activities. Also, many states use surface water quality standards under their CSGWPPs to provide site-specific ground water protection standards. Thus, a state's CSGWPP and its basin management activities can reinforce each other's goals. In fact, the effectiveness of the state's basin approach may depend on how well these basin management activities and the CSGWPP integrate important regional or site-specific concerns.

### **A.2 Surface/Ground Water Issues at the Basin and Watershed Levels**

Basin management plans under a statewide basin approach should identify surface/ground issues at both the basin and watershed level. At the basin level, certain issues tend to be broad in scope, sometimes extending across all or part of a basin, for example:

- Large areas of Kentucky, Tennessee, Virginia underlain with limestone caverns where land disposal or direct pollution of sinkholes can rapidly contaminate both surface and ground water for many miles
- Parts of Florida with underlying coral and limestone formations and underground streams
- The Eastern Snake River Plain Aquifer, where activities in the basin (e.g., irrigation, Superfund sites) have the potential of contaminating both the aquifer and the Snake River itself; the aquifer is now designated as a Sole Source Aquifer

- Portions of Arizona and elsewhere in the arid west where activities such as agriculture or mining tap into alluvial aquifers, draining them and causing loss of critical riparian habitat

State basin management plans also identify watershed-specific issues for special attention in future watershed projects. Examples of watershed-level issues affecting surface and ground water include localized problems with solid waste disposal in sinkholes, protection of springs, pollution of surficial aquifers by land activities, and localized sites where recreational activity in caverns has caused damage to sensitive aquatic biota.

### **A.3 Challenges Specific to Ground Water Protection**

There are many opportunities for integrating surface water and ground water protection. This is particularly the case where shallow aquifers, which are often highly susceptible to contamination, are directly connected to surface waters. In other respects, however, ground water protection presents challenges that differ in kind or scale from those encountered in protecting surface waters. For example, given the enormous costs and technical difficulties of ground water remediation, considerable emphasis must be placed on pollution prevention. In contrast, because surface waters are generally easier to clean up, greater emphasis under surface water programs can be given to restoring impaired waterbodies.

Other ground water-specific concerns that should be considered when designing broad protection approaches include ground water pollutant fate and transport mechanisms, monitoring considerations and resource boundaries, (e.g., aquifer boundaries may not coincide with basin boundaries). Because ground water generally flows slowly, there is often a long lag time (sometimes decades) between discharge of pollutants at the land's surface and their transport through an aquifer. This may make it difficult to locate sources of contamination and has obvious implications for enforcement and for evaluating environmental effectiveness of protection efforts. Ground water problems thus are often treated as nonpoint source pollution or in-place contaminant concerns.

Monitoring ground water quality involves sampling existing or new wells for pollutants of concern. Monitoring ground water can be very expensive compared with monitoring surface water, especially if a large network of new monitoring wells must be installed and extensive laboratory analyses of ground water consistent with the state's priorities and schedules are implemented.

CSGWPPs should be carefully coordinated with the state's general, long term Watershed Protection Approach. For maximum effectiveness in protecting water resources, states need to make conscious decisions on how CSGWPPs and basin approaches can most profitably align. The following highlight describes how Nebraska deals with interrelated ground water and surface water pollution issues.

**Linking Surface and Ground Water Management in Nebraska**

Nebraska's basin approach includes both surface water and ground water programs. Although the approach is not designed specifically for ground water, various ground water protection programs within the state are moving to a more basin-by-basin approach. The state's Wellhead Protection Program annually targets communities in selected basins to receive a more focused Wellhead Protection effort. Also, educational activities in Nebraska's CWA Section 319 nonpoint source program are coordinated with the state's basin approach. Furthermore, septic tank and underground injection control program activities are targeted to different basins in successive years.

In addition to these state-level activities, ground water management plans for dealing with ground water supplies and nonpoint sources of contamination have been developed and implemented by each of the 23 Natural Resources Districts (NRDs) that cover the state. Basin plans will be coordinated with the ground water management plan for each appropriate NRD. Since the Districts' boundaries generally follow basin delineations, they provide a logical geographical management unit for coordinating watershed protection activities at the local level. The NRDs already sponsor a large number of CWA Section 319 nonpoint source implementation projects across the state. Several NRDs have worked with the Nebraska Department of Environmental Quality to develop and implement Special Protection Areas, while other NRDs have independently developed and implemented their own Ground Water Quality Management Areas. Both designations deal with the management of nonpoint source ground water contamination. Consequently, although ground water activities in Nebraska are not specifically included in the basin approach, in effect the state's high-priority ground water concerns are being addressed basin by basin.